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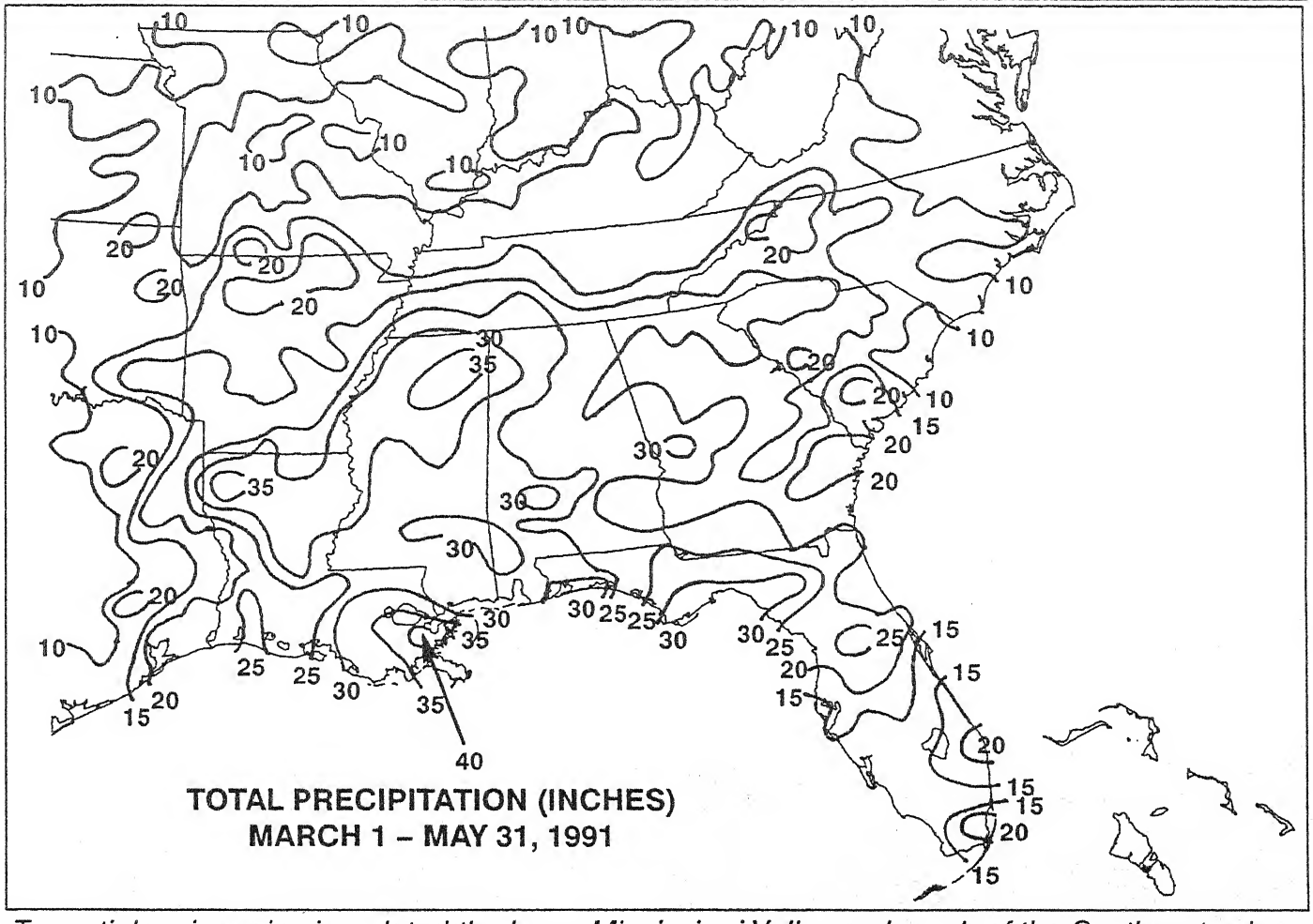
CLIMATE
SUMMARY

WEEKLY CLIMATE BULLETIN

No. 91/24 Washington, DC June 15, 1991



Torrential spring rains inundated the lower Mississippi Valley and much of the Southeast, where as much as 40 inches fell in southeastern Louisiana. The persistent heavy rains flooded rivers and bayous, forcing the evacuation of homes and damaging sewage treatment facilities. Farmland flooding has ruined rice plantings and vegetable crops, delayed or prevented cotton planting, and impeded the development of sugar cane.

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL WEATHER SERVICE–NATIONAL METEOROLOGICAL CENTER

CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- *Highlights of major climatic events and anomalies.*
- *U.S. climatic conditions for the previous week.*
- *U.S. apparent temperatures (summer) or wind chill (winter).*
- *U.S. cooling degree days (summer) or heating degree days (winter).*
- *Global two-week temperature anomalies.*
- *Global four-week precipitation anomalies.*
- *Global monthly temperature and precipitation anomalies.*
- *Global three-month precipitation anomalies (once a month).*
- *Global twelve-month precipitation anomalies (every three months).*
- *Global three-month temperature anomalies for winter and summer seasons.*
- *Special climate summaries, explanations, etc. (as appropriate).*

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JUNE 15, 1991

1. Central and Southeastern North America:

SCATTERED HEAVY RAINS PREVAIL.

Most locations measured somewhat lower totals than during previous weeks, with several notable exceptions. Excessive rainfall (up to 260 mm) flooded the Louisiana Bayou, and scattered heavy amounts (50–165 mm) soaked portions of central Texas, the west-central and western Gulf Coast, southern Florida, eastern Nebraska, Iowa and southern Wisconsin, and the Tennessee Valley. Significant moisture surpluses are now restricted to two primary locations: Along the central two-thirds of the Gulf Coast, where 200–315 mm of excess rain has fallen since early May, and from southeastern Wyoming eastward through the western Corn Belt, where 50–170 mm above normal totals were measured during the same period [12 weeks].

2. Central North America:

SLIGHTLY COOLER WEATHER OBSERVED.

Weekly departures of +3°C to +5°C affected south-central Canada, the upper Midwest, and the Great Lakes while only slightly above normal temperatures were recorded elsewhere [Ending after 7 weeks].

3. Central South America:

RAINFALL TOTALS DECREASE.

A small portion of northeastern Argentina and western Uruguay measured 15–75 mm, but most locations received little or none, causing rainfall surpluses to decline [Ending after 5 weeks].

4. Europe:

MOST AREAS REMAIN ABNORMALLY CHILLY.

A large portion of Europe from the Alps northward to Scandinavia, including the British Isles, as well as much of Greece and western Turkey again recorded weekly temperature departures of -2°C to -4°C [9 weeks].

5. Sahel:

HEAVY RAINFALL DIMINISHES.

A small portion of southeastern Mali and western Burkina Faso measured 25–55 mm of rain, as did southern sections of Ghana, Cote d'Ivoire, Benin, Togo, and Chad. Elsewhere, much of the west-central Sahel and central portions of Sudan and Ethiopia observed only 10–25 mm [Ending after 8 weeks].

6. The Newlands:

HOT, DRY WEATHER AFFECTS CROPS.

Persistent dryness and periodic heat have reduced topsoil moisture creating unfavorable conditions for growth of spring grains. Precipitation has been around half the normal since early April while temperatures have averaged as much as 7°C greater than normal since mid May [4 weeks warm, 11 weeks dry].

7. Western India, Pakistan, and Afghanistan:

SWELTERING HEAT CONTINUES.

Temperatures averaged 2°C to 5°C above normal, with the lowest departures measured across western India where slightly cooler conditions accompanied late-week rainfall. The mercury reached 48°C and high humidities generated apparent temperatures above 50°C in Pakistan [3 weeks].

8. Southwestern India and Sri Lanka:

DELUGING RAINFALL BRINGS WIDESPREAD FLOODING AND LANDSLIDES.

Unofficial reports indicate that weekly rainfall totals approaching 800 mm inundated much of the southwestern India and Sri Lanka since the beginning of June. According to press reports, A 40-year old daily rainfall record was shattered in Bombay on Sunday when parts of the city received up to 635 mm. Since the deluge began, more than 100,000 individuals have lost their dwellings, and several dozen have lost their lives [2 weeks].

9. Eastern and Northeastern China:

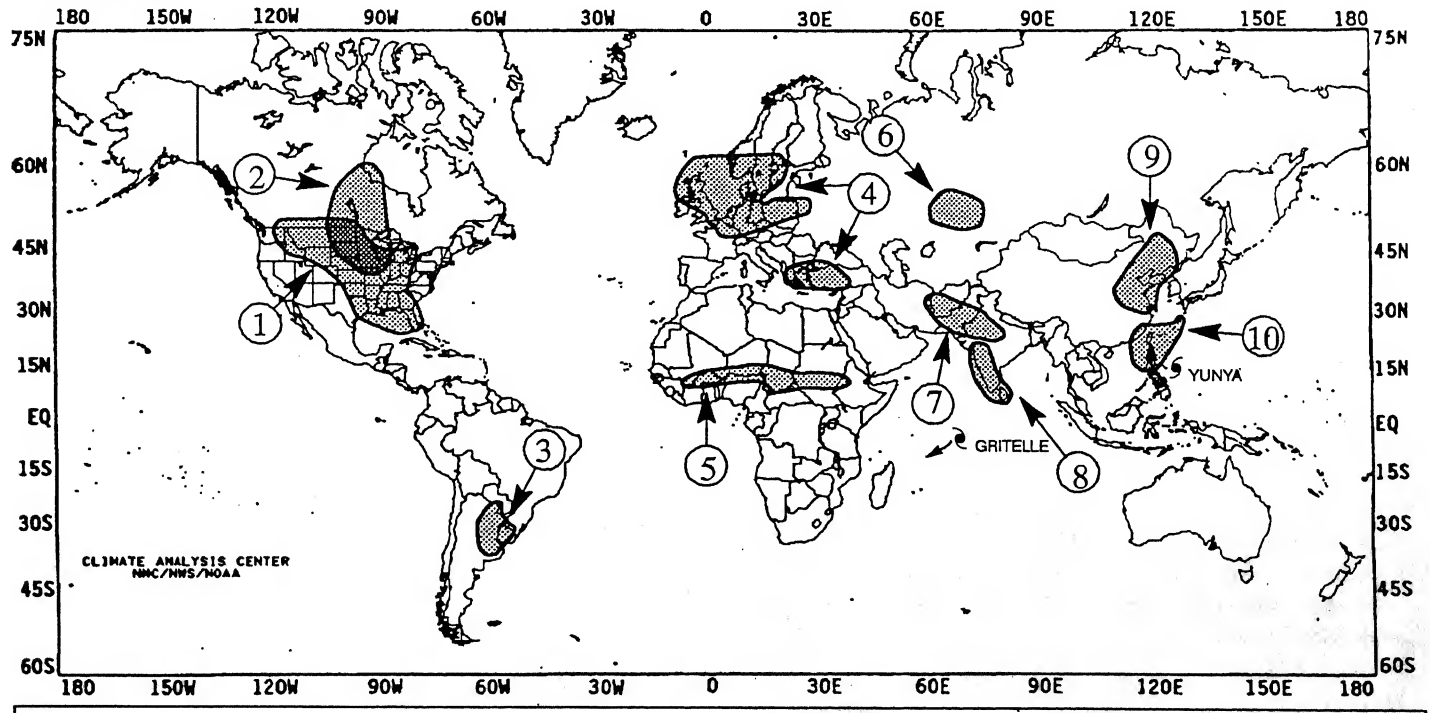
EXCESSIVE RAINS INUNDATE BEIJING AND THE YANGTZE RIVER VALLEY.

Rainfall totals of 20–100 mm were widespread across eastern and northeastern China, with up to 280 mm soaking the Yangtze River Valley. Farther north, press reports indicate that up to 380 mm may have bombed parts of the Beijing area during one day. More than 11 dozen individuals lost their lives in resultant urban and river flooding, according to press reports [2 weeks].

10. The Ryukyus, Taiwan, Luzon, and Extreme Southeastern China:

MOST AREAS CRITICALLY DRY WHILE TYPHOON YUNYA SMASHES SOUTHERN LUZON.

As Mount Pinatubo erupted in central Luzon, Typhoon Yunya a small but powerful system, brought daily rainfall totals up t 185 mm to southern Luzon and Samar. The remainder of the region, however, continued to experience exceedingly dry weather. Only scattered totals of 15–30 mm allowed six-week departures to reach 100–705 mm. According to Taiwan Council of Agriculture, crop losses due to the long-term dry than began last October have reached $60 million [6 weeks



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.
MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF JUNE 9–15, 1991

Although Summer has not officially begun, much of the nation experienced summer-like heat last week. Record daily highs were established from New England to the Far West as readings soared into the nineties. High humidities combined with the heat in southern Texas to produce apparent temperatures over 105°F. Strong thunderstorms erupted from the Great Plains to New England, dumping heavy rain, hail, and generating wind gusts up to 75 mph. Over 10 inches of rain drenched portions of southeastern Louisiana. Flash flooding was widespread in New Orleans after 5 inches of rain fell in two hours on Monday, closing roads and leaving nearly two feet of water in some homes and businesses. Flash floods also affected parts of Texas and Tennessee, flooding a number of roads and washing out bridges in Longview, TX and Paris, TN. A thunderstorm produced fatal lightning at the Hazeltine Country Club in Minneapolis, MN during the U.S. Open Golf Tournament. Thunderstorms also spawned over two dozen tornadoes from Colorado to Connecticut. Hardest hit was Minitare, NE where nearly 50 homes were either destroyed or damaged, according to press reports. Elsewhere, unseasonably cool conditions affected the Pacific Northwest and parts of the northern Rockies. Lows dipped into thirties and produced record daily minimum temperatures at some locations while to the east, frost covered the ground across portions of western Wyoming. Farther north, mixed precipitation fell in the Tanana and Yukon Valley's of Alaska.

The week began with a dome of high pressure firmly entrenched in the eastern U.S. Highs soared near 90°F from the central High Plains eastward. A moist flow of air on the western side of the high raised humidity levels across the central U.S. which fueled thunderstorms across the Great Plains, Midwest, and the South. The muggy warm air collided with a cold front in the northern Plains and central Rockies to produce severe thunderstorms and several tornadoes from Colorado to Minnesota. Farther south, thunderstorms dropped copious amounts of rain, causing flooding across portions of Louisiana and Texas. Up to 3 feet of water covered Highway 96 near Buna, TX and Highway 259 near Longview, TX. To the east, up to 5
n soaked New Orleans, LA on Monday and an
inches fell on Tuesday, causing back-to-back
arther west, hot weather settled
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much of the remainder of the
ove 100°F in central California and
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of the week, summer-like
he eastern half of the nation
while cooler conditions overspread the West. Record daily highs were established in the central Appalachians and southern New England as highs approached 100°F. To the west, thunderstorms dropped heavy rain on the Midwest and Great Plains along and ahead of a cold front. One storm doused Cass County, IA with up to 6 inches of rain, causing street flooding and forced the Nishnabotna River to overflow it banks. Another storm generated a lightning strike that took the life of one person and injured several others in Minneapolis, MN, according to press reports. Farther west, much cooler weather settled west of the Rockies. Several record lows were established across parts of the Northwest and northern Rockies as readings dipped into the thirties.

According to the River Forecast Centers, the greatest weekly totals (more than 2 inches) fell on central and eastern Texas, the eastern Great Plains, the Mississippi and Tennessee Valley's, extreme southern Florida, central New England, and scattered locations in the Great Lakes, Ohio Valley, central Rockies, Pacific Northwest, southern Alaska, and Hawaii (Table 1). Light to moderate amounts were measured across the remainders of New England, the Ohio Valley and Great Lakes, portions of the South, the central and southern Rockies, the western halves of Oregon and Washington, and most of central and southern Alaska. Little or no precipitation fell on the mid-Atlantic, northern and central Florida, the northern Rockies, the Far West, and the remainders of Hawaii and Alaska.

Unseasonably warm conditions overspread much of the nation from the Far West to East Coast (Table 2). Weekly departures between +6°F and +9°F were prevalent across the northern Plains, Midwest, interior California and western Nevada as readings soared into the nineties and above 100°F in interior California. Departures of +3°F to +5°F were common from the central coast of California to the north Atlantic Coast. Near to slightly above normal temperatures covered the southern half of Florida, the southern quarter of Texas, and much of Hawaii. In Alaska, mild conditions prevailed across the northern locations with weekly departures up to +9°F recorded at Nome as highs soared above 60°F. Slightly above normal temperatures prevailed across western and central Alaska with departures of +2°F to +4°F common.

Meanwhile, unseasonably cool weather prevailed along the Gulf Coast westward to the southern Rockies, and in the Pacific Northwest (Table 3). Weekly departures to -5°F were recorded from western Texas to southern Arizona, and from eastern Washington to western Montana. Near to slightly below normal temperatures affected a small portion of western New England with departures down to -3°F and across the southeastern quarter of Alaska.

TABLE 1. *SELECTED STATIONS WITH 2.50 OR MORE INCHES OF PRECIPITATION DURING THE WEEK OF JUNE 9 – 15, 1991*

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
CORPUS CHRISTI NAS, TX	6.86	GALVESTON, TX	3.16
NEW ORLEANS/LAKE FRONT, LA	5.78	HILO/LYMAN, HAWAII HI	3.01
NEW ORLEANS NAS, LA	5.49	BLYTHEVILLE AFB, AR	2.86
NEW ORLEANS/MOISANT, LA	3.91	SIOUX FALLS, SD	2.84
OMAHA/EPPLEY, NE	3.76	MUSKEGON, MI	2.65
NORTH OMAHA, NE	3.70	ROCKFORD, IL	2.58
PORT ARTHUR, TX	3.62	COLUMBIA, MO	2.57
HOUSTON, TX	3.44	OMAHA/OFFUTT AFB, NE	2.55
DUBUQUE, IA	3.31	COLUMBUS AFB, MS	2.52
LAKE CHARLES, LA	3.20	MCCOMB, MS	2.50

TABLE 2. *SELECTED STATIONS WITH TEMPERATURES AVERAGING 7.0°F OR MORE ABOVE NORMAL FOR THE WEEK OF JUNE 9 – 15, 1991*

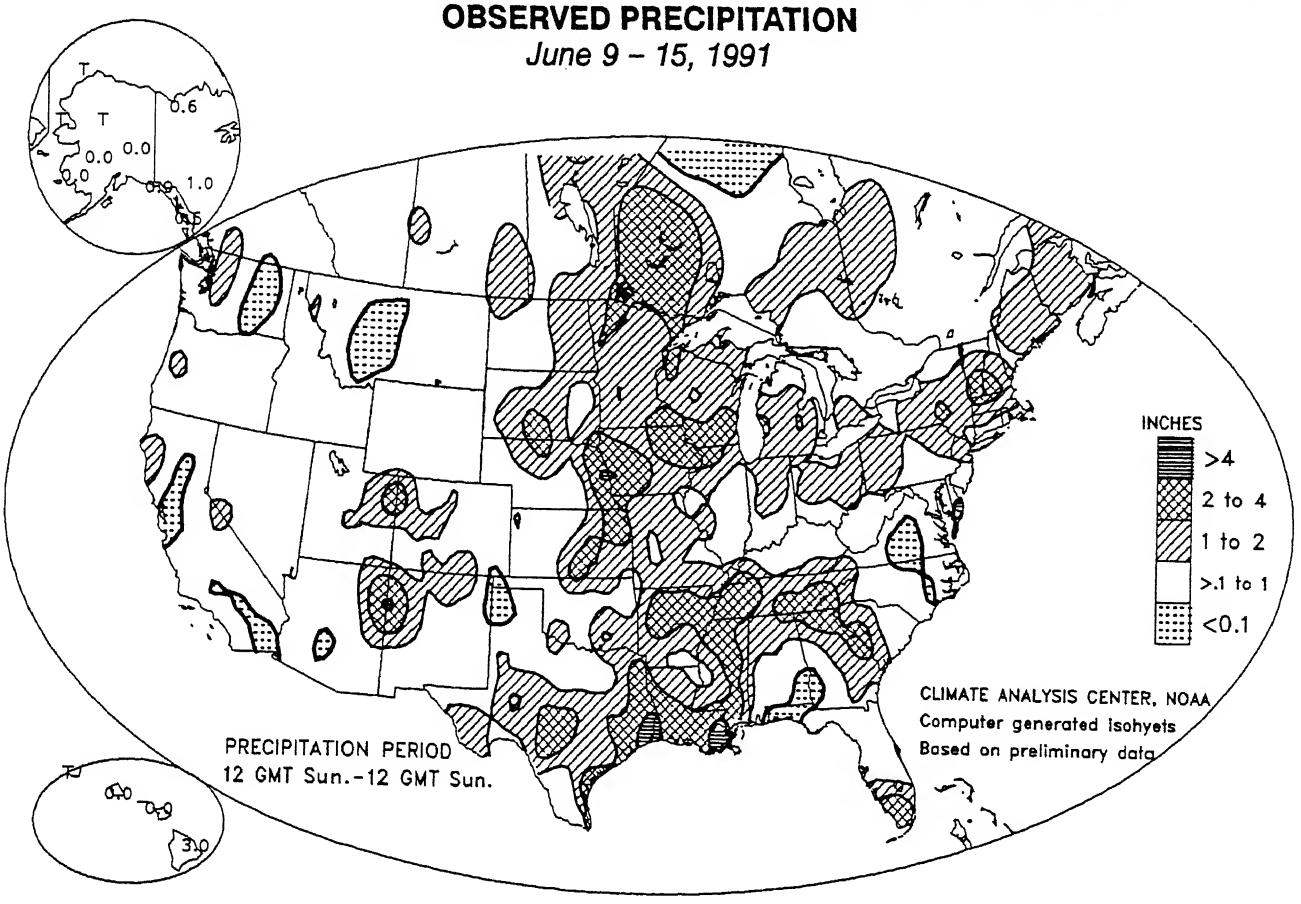
STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
MILWAUKEE, WI	+9.8	73.9	ST. CLOUD, MN	+7.4	71.8
DEVIL'S LAKE, ND	+9.4	70.7	RENO, NV	+7.4	68.9
VICTORVILLE/GEORGE AFB, CA	+9.2	79.7	WATERLOO, IA	+7.3	75.8
GRAND FORKS, ND	+8.7	71.9	MADISON, WI	+7.3	73.4
HURON, SD	+8.4	75.1	INTERNATIONAL FALLS, MN	+7.3	67.7
FARGO, ND	+8.3	72.8	LA CROSSE, WI	+7.2	75.0
ABERDEEN, SD	+8.1	73.4	EAU CLAIRE, WI	+7.2	72.4
DEVIL'S LAKE, ND	+8.0	69.5	DUBUQUE, IA	+7.1	74.1
ALEXANDRIA, MN	+7.7	72.0	HOUGHTON LAKE, MI	+7.1	69.3
TRAVERSE CITY, MI	+7.6	70.5	CHICAGO/O'HARE, IL	+7.0	74.7
DECATUR, IL	+7.4	79.6			

TABLE 3. *SELECTED STATIONS WITH TEMPERATURES BELOW NORMAL FOR THE WEEK OF J*

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION		
TRUTH OR CONSEQUENCES, NM	-6.8	69.9	WINSLOW, AZ	-4.6	67.0
DEMING, NM	-6.4	70.0	DOUGLAS, AZ	-4.6	71.7
ALBUQUERQUE, NM	-6.0	68.3	SAN ANGELO, TX	-4.6	76.1
BIG DELTA, AK	-5.8	50.7	WALLA WALLA, WA	-4.5	61.3
BETTLES, AK	-5.7	51.9	LEWISTON, ID	-4.2	60.8
EL PASO, TX	-5.7	75.2	TUCUMCARI, NM	-4.1	71.6
WENATCHEE, WA	-5.3	61.3	KALISPELL, MT	-3.9	53.5
PENDLETON, OR	-5.2	60.0	CARLSBAD, NM	-3.9	76.3
SPOKANE, WA	-4.9	55.8	MEACHAM, OR	-3.7	49.0
YAKIMA, WA	-4.8	58.7	FAIRBANKS, AK	-3.7	55.2

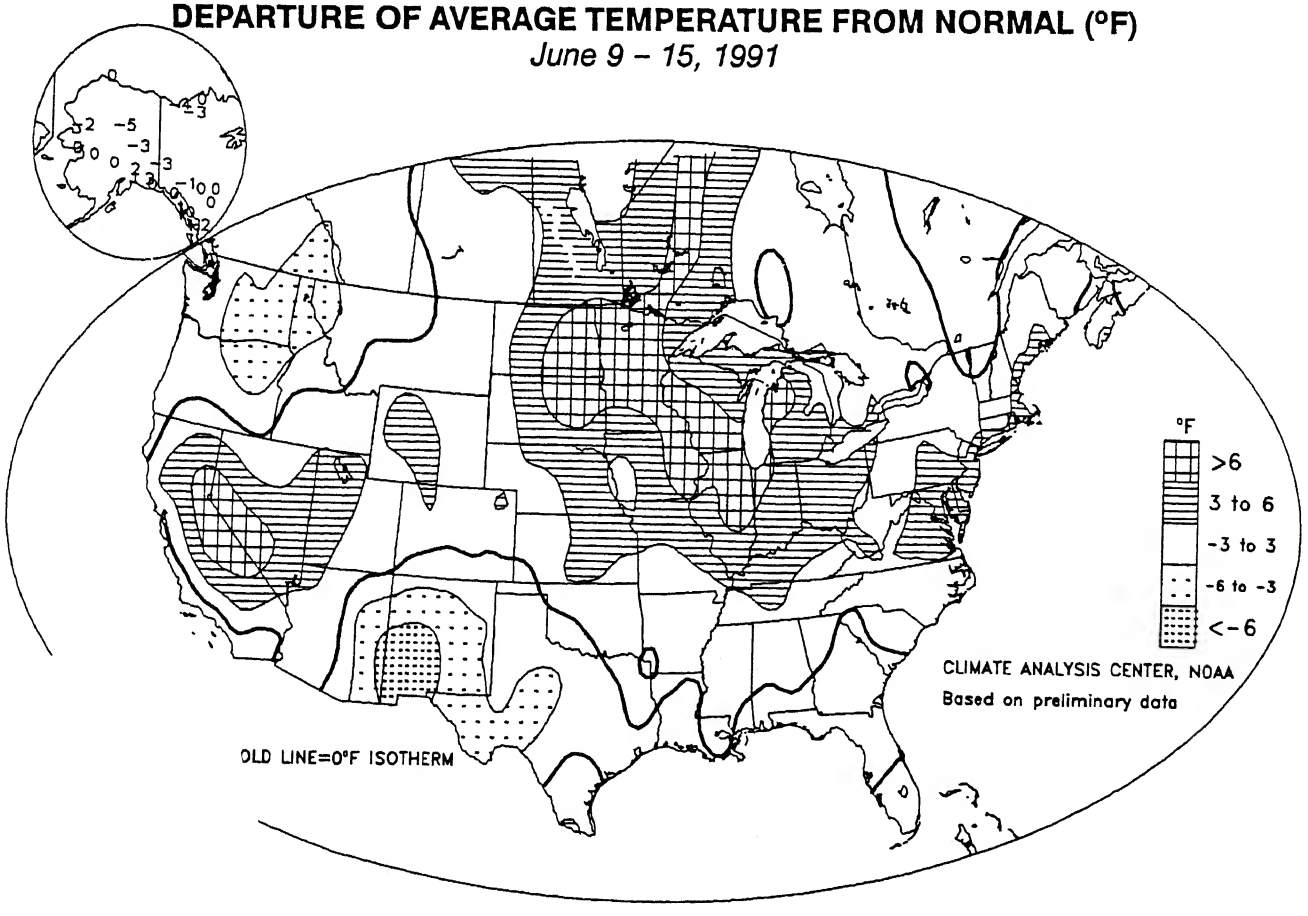
OBSERVED PRECIPITATION

June 9 – 15, 1991



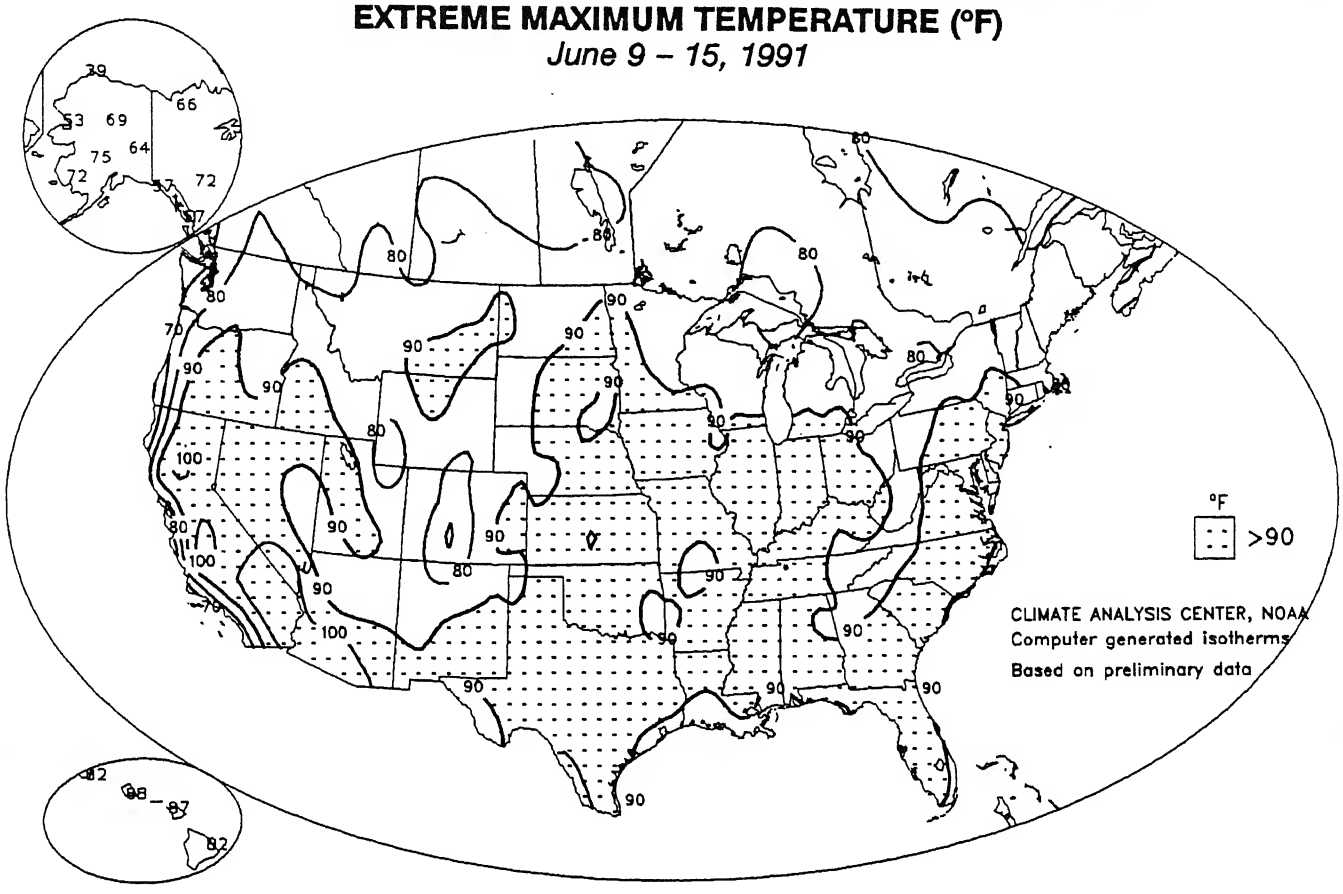
DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

June 9 – 15, 1991



EXTREME MAXIMUM TEMPERATURE (°F)

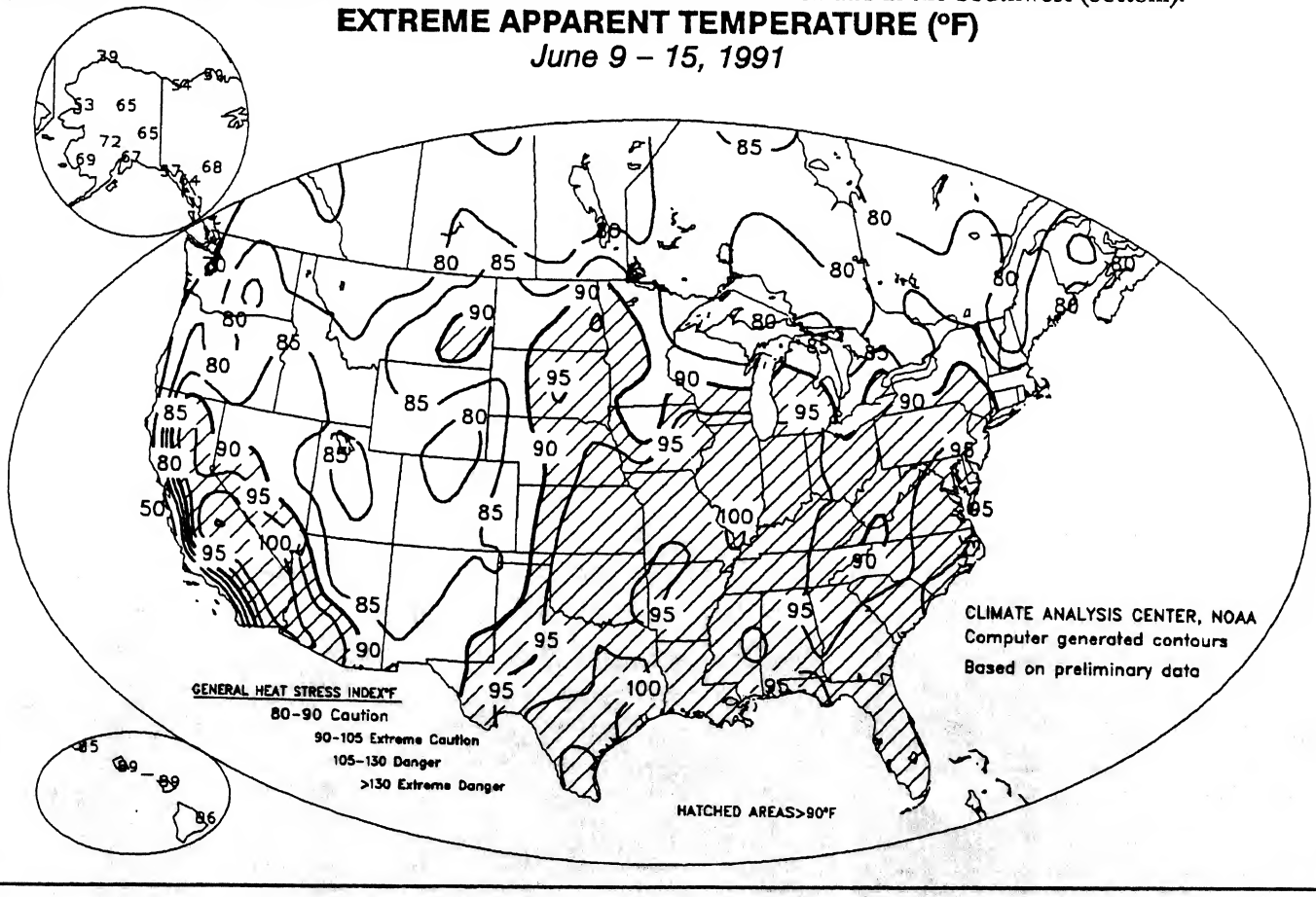
June 9 – 15, 1991

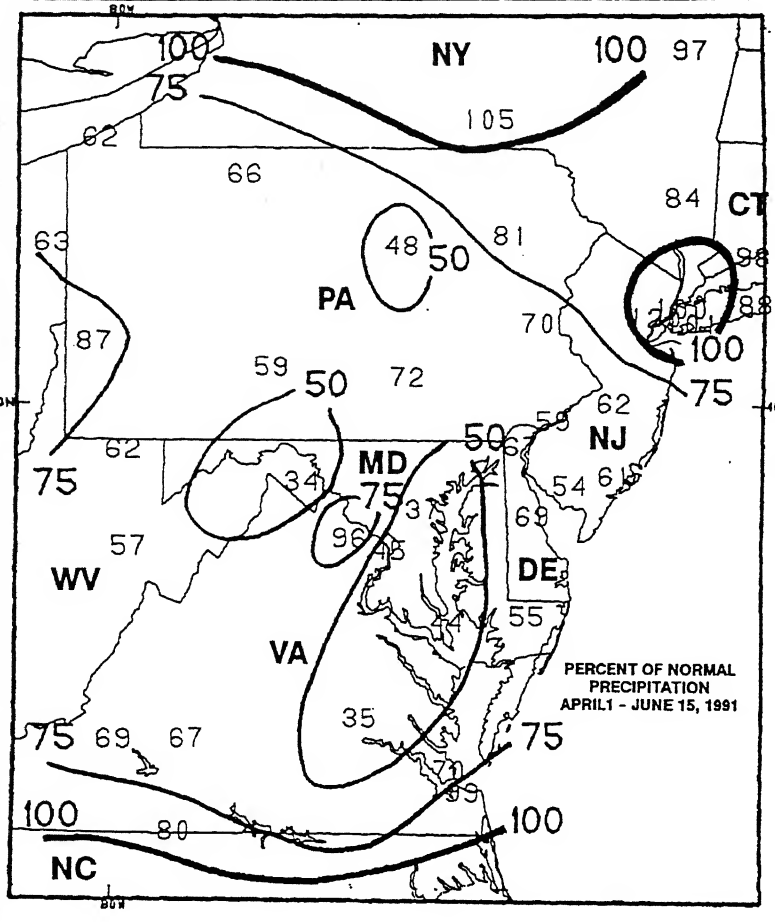


Unseasonably warm conditions enveloped a large portion of the nation as highs soared above 90°F across much of the East, South, Midwest, Great Plains and Far West (top). High relative humidities combined with the heat to produce apparent temperatures near 100°F across most of the eastern two-thirds of the nation and in the Southwest (bottom).

EXTREME APPARENT TEMPERATURE (°F)

June 9 – 15, 1991



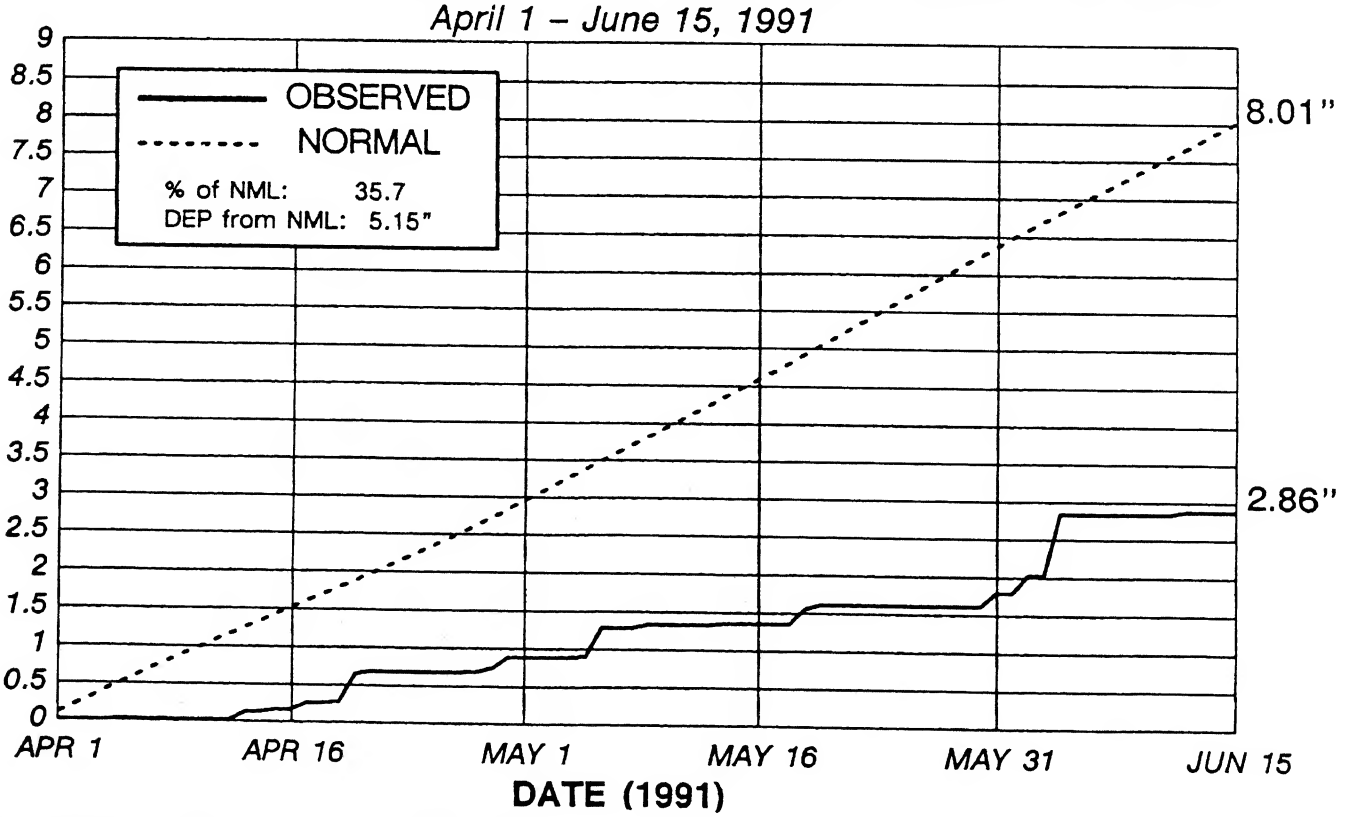


Although much of the nation has been receiving abundant precipitation this spring, dryness has developed over the mid–Atlantic where less than half the normal precipitation has fallen over much of the region during the last 11 weeks (left). Richmond, VA, has accumulated only 2.86 inches during this period, 5 inches less than normal (bottom). The dry conditions have been aggravated by a recent heat where, according to press reports, many crops are close to being permanently damaged, in part because the dryness arrived during the spring planting.

RICHMOND, VA

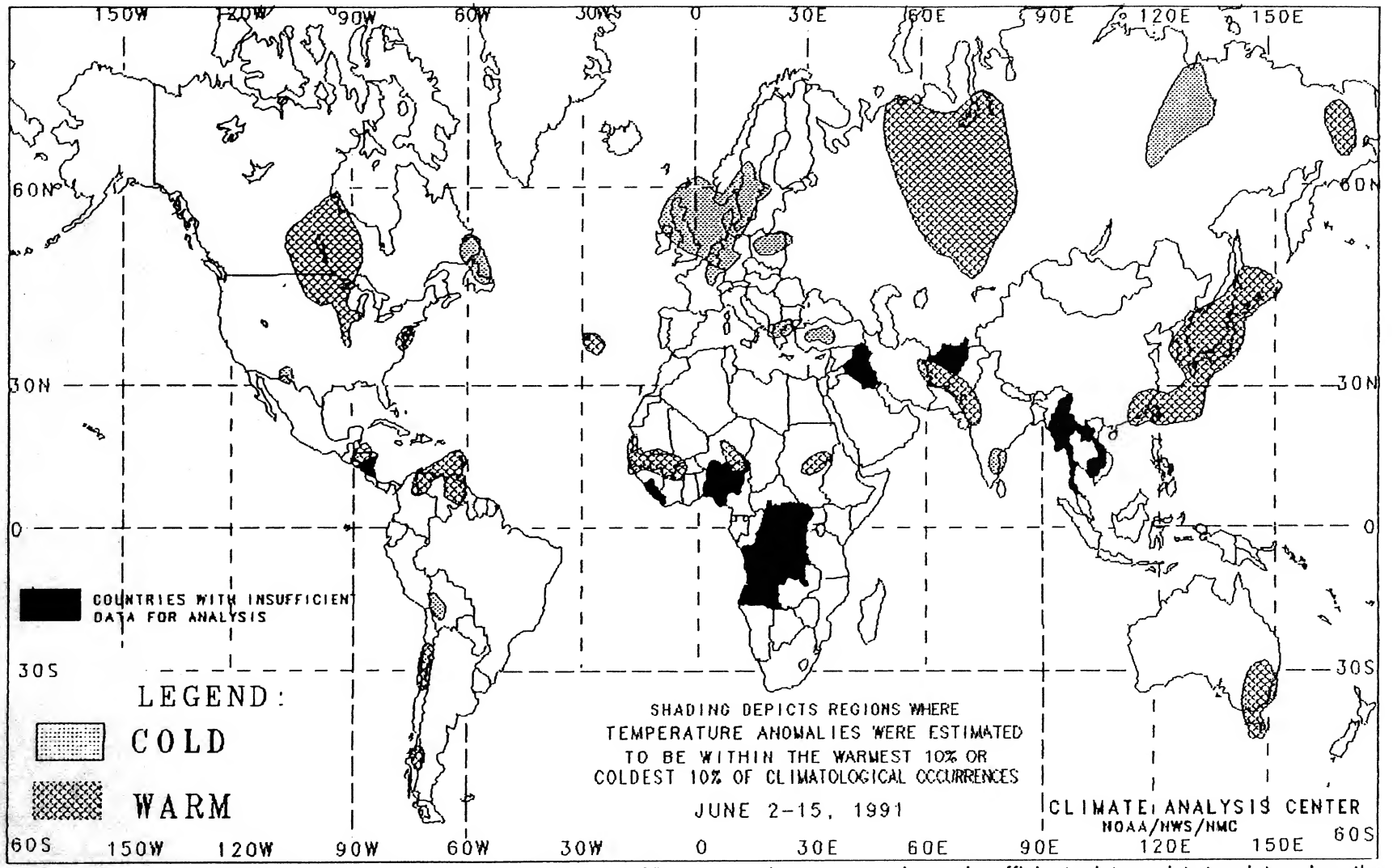
CUMULATIVE OBSERVED vs. NORMAL PRECIPITATION

April 1 – June 15, 1991



2-WEEK GLOBAL TEMPERATURE ANOMALIES

JUNE 2 – 15, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

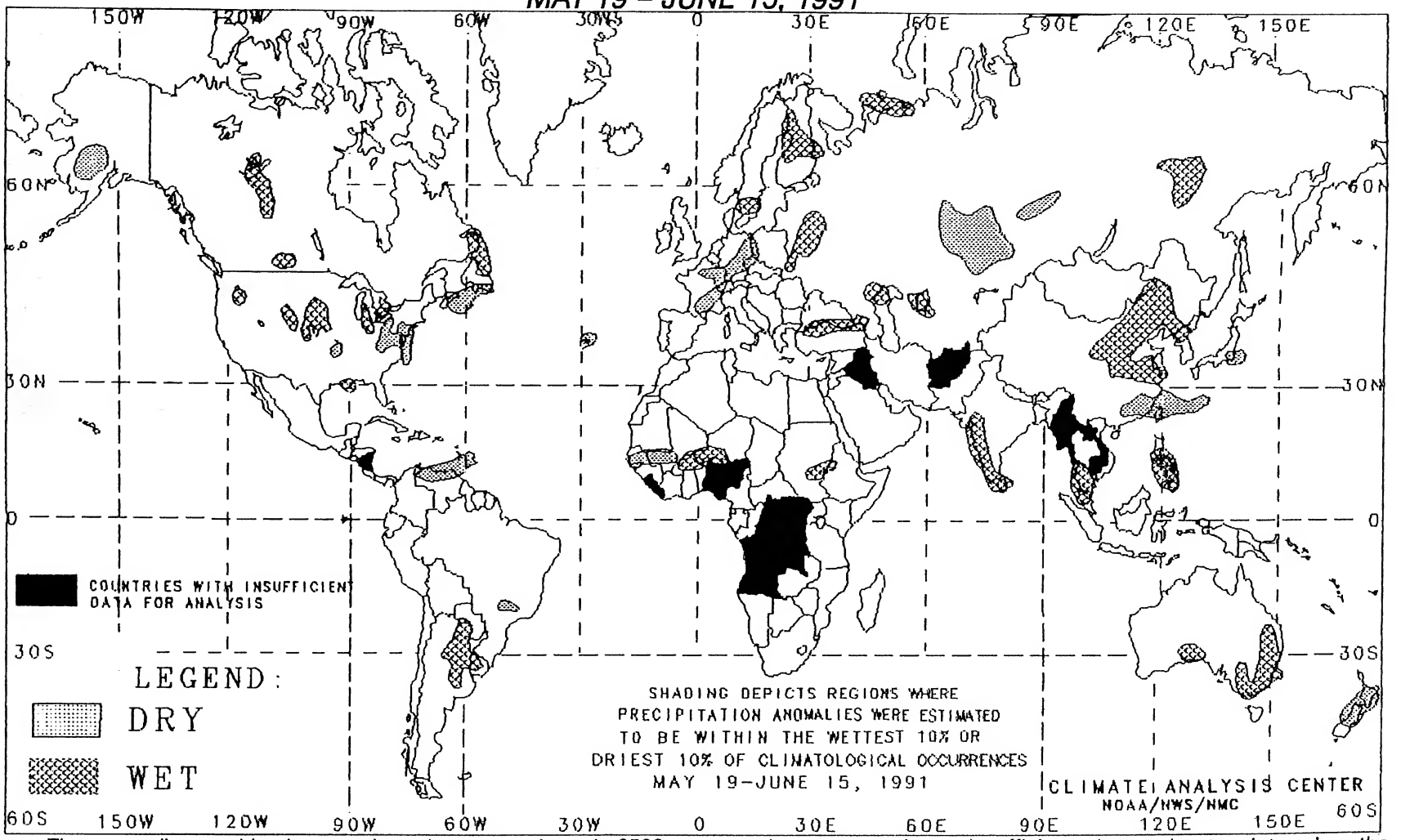
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

4-WEEK GLOBAL PRECIPITATION ANOMALIES

MAY 19 – JUNE 15, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

UNITED STATES SEASONAL CLIMATE HIGHLIGHTS

SPRING (MARCH–MAY) 1991

Spring is a transitional season between the cold and relatively dry conditions of winter and the hot and humid weather of summer. When these two contrasting air masses meet, they are usually accompanied by severe weather that includes torrential downpours, damaging winds, large hail, and tornadoes. This Spring was no exception as widespread and numerous severe weather outbreaks afflicted the nation, including a record number of tornadoes (884), easily breaking the previous spring record of 537 set in 1982 [Figure 1]. The most intense outbreaks occurred on April 9 when 37 twisters were reported from Mississippi to New York, and on April 26 when tornadoes ravaged the Wichita, KS area, killing dozens of people. Spring thunderstorms also generated copious downpours, causing severe flooding from the Rockies to the Atlantic Coast. The most serious flooding was in the lower Mississippi Valley where many rivers remained out of their banks for weeks on end, resulting in prolonged residential flooding that left more than 8,000 individuals homeless. Additionally, farmland flooding ruined many rice plantings and delayed or prevented cotton planting. Farther north in water-logged northern and central Iowa, corn planting lagged well behind average. In California, a series of March storms finally brought badly-needed precipitation, somewhat easing critical water shortages during the state's 5-year drought. During April and May, however, well below normal precipitation returned to the area as hydrological drought continued going into the typically dry summer season. Overall, ample precipitation covered much of the lower 48 states as this Spring was ranked as the eleventh wettest since 1895 [page 10]. In addition, March–May 1991 was marked by abnormal warmth over the eastern two-thirds of the country. Across the contiguous U.S., Spring 1991 temperatures were the ninth warmest on record [page 10]. If it were not for anomalously cool weather in the Far West, the national spring temperature ranking would have been much higher.

The Spring began with intense Pacific storm systems laden with moist subtropical air sweeping into drought-stricken California, dumping torrential rain on the southern half of California and much of Arizona. By mid-month, the weather pattern shifted as subsequent storms, originating from the Gulf of Alaska, brought much colder air and additional precipitation to the Pacific Coast. These storms buried portions of the Cascades, Sierra Nevadas, Great Basin, and northern and central Rockies under several feet of snow. Stormy weather also blasted the East as heavy rains soaked the Gulf and Atlantic Seaboards. The storm systems also generated dozens of tornadoes in the nation's midsection and in the Southeast, and even a few rare twisters in California. Farther north, ice storms glazed the upper and middle Mississippi Valley into the Northeast, knocking out power for several weeks in some locations. Heavy snow also blanketed the western Corn Belt, Great Lakes, and northern New England. Unusual March warmth was widespread ahead of the storm systems as numerous high temperature records were broken from the Great Plains to the Atlantic Coast.

April started on a tranquil note as generally dry and mild weather prevailed. A late-season storm, however, dumped heavy rain on the Pacific Northwest as several stations broke April rainfall records by the 5th. As the month progressed, storm centers repeatedly dug into the central Rockies and lifted out through the Great Lakes. This pattern held cool air in the West while pumping humid, warm air into the eastern half of the nation. Powerful thunderstorms, often accompanied by outbreaks of tornadoes, battered the lower and middle Mississippi Valley, Gulf and southern Atlantic Coasts, central Plains, and the Northeast. Record April rains in the Mississippi Delta forced the evacuation of many homes and saturated soils, delaying the planting of crops. Storms also blanketed the northern Intermountain West, northern and central Rockies, and northern Plains with heavy snow, providing beneficial moisture. Dry conditions prevailed in California, the Southwest, and parts of the Ohio Valley, mid-Atlantic, and central Alaska.

May commenced with powerful thunderstorms scattered across the Great Plains, South, and parts of New England. Several storms inundated flood-ravaged Louisiana with over 10 inches of rain during the first two weeks of the month. Flash flooding occurred in the Plains after thunderstorms dumped heavy downpours in short time intervals. Destructive wind gusts and tornadoes caused widespread damage from South Dakota to New York. During the latter half of the month, summer-like heat and humidity sizzled the nation east of the Rockies as many May record high temperatures were set. Readings reached the century mark at Norfolk, VA at the month's end. Farther south, up to 11 inches of rain soaked southern Florida and portions of the Gulf Coast. Meanwhile, cool conditions remained in the West as temperatures dipped below freezing from the Pacific Northwest to the northern Rockies, and snow covered the mountains of Utah and Wyoming. Heavy rain in southern Alaska aided firefighters efforts to contain a wildfire in the Kenai Wildlife Refuge.

According to the River Forecast Centers, the greatest seasonal precipitation (more than 20 inches) was reported across much of the South from eastern Texas and eastern Oklahoma to the southern Atlantic Coast, in the Sierra Nevadas and Cascades, along the southern Alaskan Coast, on the Big Island of Hawaii, and at scattered locations in the western Corn Belt [Table 1]. Amounts over 30 inches inundated much of Louisiana, Mississippi, southern Alabama, and the panhandle of Florida. Above normal precipitation covered much of the United States [Figures 2 and 3] as the nine regions ranked near or in the upper third of the historical distribution. The East-North Central had the wettest spring since 1895 while the Southeast reported the second wettest March–May on record [page 10]. On a state-wide basis, Florida, Louisiana, and Iowa had the wettest spring during the past 97 years, and 9 other states observed one of the ten wettest springs ever [page 11].

In contrast, dry weather (less than 75% of normal) was limited to the southern High Plains, in parts of the Rockies, central Plains, upper Ohio Valley, mid-Atlantic, and the western Hawaiian islands [Table 2, Figures 2 and 3]. Rainfall was also light in parts of south-central Alaska where wildfires raged in the Kenai Wildlife Refuge. On a state-by-state basis, only Colorado, Maryland, New Mexico, and Oklahoma ranked in the lower third of the historical distribution, and only two other states (PA and TX) were in the lower half of the long-term distribution.

Warmer than normal spring conditions dominated the eastern three-fourths of the nation and much of Alaska as temperatures averaged more than 2°F above normal [Figures 4 and 5]. The largest departures occurred from the northern and central Plains to the mid-Atlantic and in eastern and central Alaska where temperatures averaged 4 to 6°F above normal [Table 3]. Regionally, the Northeast, Central, Southeast, East-North Central, and South had the second, second, third, fourth, and fifth warmest spring since 1895, respectively [page 10]. Nine states (KS, KY, NH, NC, OH, OK, RI, VT, and VA) experienced the warmest spring during the past 97 years, and 15 other states recorded either the second or third warmest March–May ever [page 12]. Temperatures were near to slightly above normal in Hawaii.

Subnormal seasonal temperatures were limited to the Far West where temperatures averaged less than -2°F in the Great Basin, eastern California, and eastern Oregon [Table 4, Figures 4 and 5]. Regionally, only the West (13th) and Northwest (20th) ranked in the lower third of the historical distribution as prolonged, intensive cold spells were scarce or non-existent east of the Rockies during the Spring.

TEMPERATURE AND PRECIPITATION RANKINGS FOR MARCH–MAY 1991, BASED ON THE PERIOD 1895 TO 1991. 1 = DRIEST/COLDEST AND 97 = WETTEST/HOTTEST.

REGION	*PRECIPITATION*	*TEMPERATURE*
NORTHEAST	64	**96**
EAST NORTH CENTRAL	**97**	**94**
CENTRAL	67	**96**
SOUTHEAST	**96**	**95**
WEST NORTH CENTRAL	**93**	85
SOUTH	83	**93**
SOUTHWEST	65	46
NORTHWEST	**90**	20
WEST	**92**	13
NATIONAL	87	**89**

National Climatic Data Center

Top 10 rankings : **BOLD** Bottom 10 rankings : *Italics*

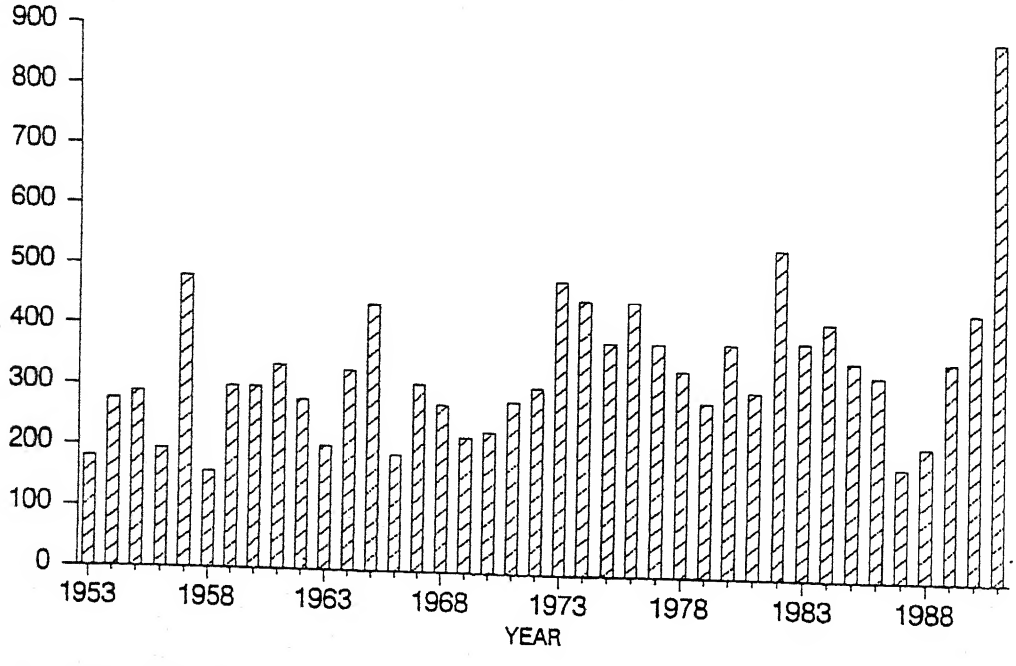


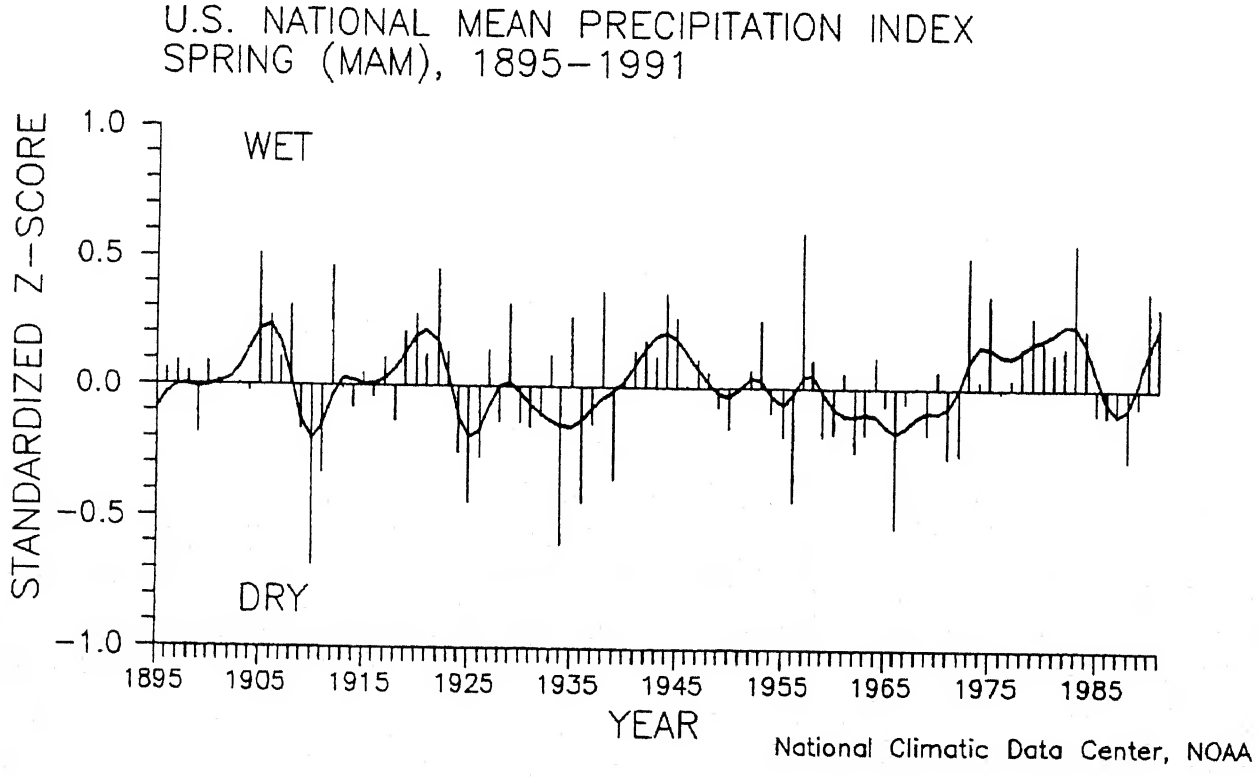
FIGURE 1. Total Number of Tornadoes in the Contiguous U.S., Spring (March–May), 1953–1991. *Tornado activity during Spring, 1991 was a record 884, much above the 1953-1990 average of 322 and surpassing the old record of 537 in 1982. The preliminary count, however, is general higher than the final count. In 1990, for example, the preliminary tornado count for the year was 19 percent higher than the final count.*

PRECIPITATION RANKINGS FOR MARCH–MAY 1991, BASED ON THE PERIOD 1895 TO 1990. 1 = DRIEST, 97 = WETTEST.

STATE	*RANK*	*STATE*	*RANK*	*STATE*	*RANK*	*STATE*	*RANK*
AL	**95**	**IA**	**97**	NE	72	RI	83
AZ	84	KS	58	NV	84	SC	80
AR	79	KY	58	NH	49	**SD**	**95**
CA	**92**	**LA**	**97**	NJ	67	TN	79
CO	28	ME	67	NM	27	TX	38
CT	77	MD	17	NY	78	UT	82
DE	51	MA	75	NC	72	VT	57
FL	**97**	MI	**92**	ND	82	VA	51
GA	**92**	**MN**	**94**	OH	46	WA	83
ID	**88**	**MS**	**94**	OK	28	WV	51
IL	79	MO	57	OR	83	WI	**88**
IN	70	MT	72	PA	38	WY	86

National Climatic Data Center

Top 10 rankings : **BOLD** Bottom 10 rankings : *Italics*



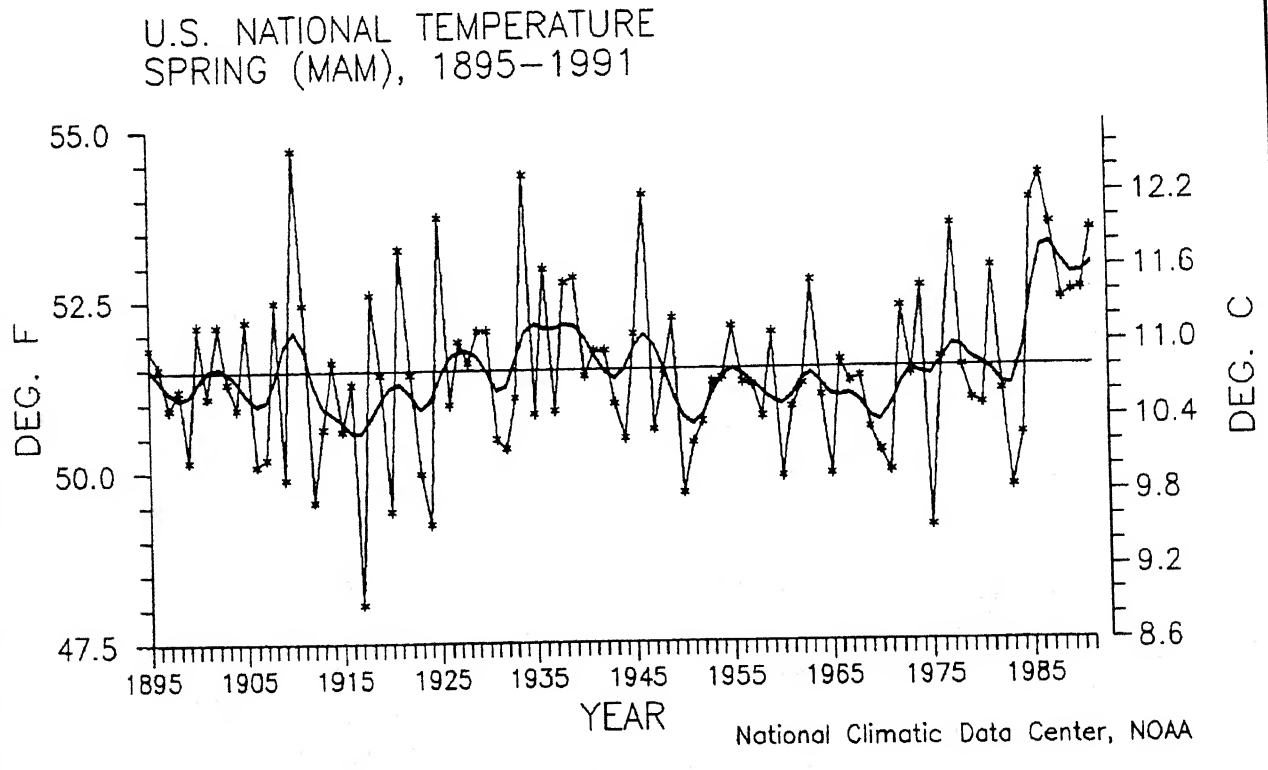
ıtional Mean Spring (March-May) Precipitation Index, 1895-1991, Computed by the ıtional Climatic Data Center. *Spring 1991 ranks as the 11th wettest spring on record.*

TEMPERATURE RANKINGS FOR MARCH-MAY 1991, BASED ON THE PERIOD 1895 TO 1991. 1 = COLDEST AND 97 = WARMEST.

STATE	RANK	STATE	RANK	STATE	RANK	STATE	RANK
AL	87	IA	**94**	NE	90	RI	**97**
AZ	27	KS	**97**	NV	22	SC	**95**
AR	**90**	KY	**97**	NH	**97**	SD	83
CA	11	LA	**91**	NJ	**96**	TN	**96**
CO	71	ME	**88**	NM	65	TX	**90**
CT	**96**	MD	**95**	NY	**96**	UT	21
DE	**93**	MA	**95**	NC	**97**	VT	**97**
FL	**95**	MI	**95**	ND	**91**	VA	**97**
GA	**95**	MN	**93**	OH	**97**	WA	18
ID	42	MS	**94**	OK	**97**	WV	**96**
IL	**96**	MO	**95**	OR	11	WI	**94**
IN	**95**	MT	66	PA	**96**	WY	68

National Climatic Data Center

Top 10 rankings : **BOLD** Bottom 10 rankings : *Italics*



Nationally Averaged Spring (March-May) Temperatures, 1895-1991, Computed by the National Climatic Data Center. *Spring 1991 ranks as the 9th warmest on record. National mean spring temperatures for the last 7 years have been abnormally high.*

TABLE 1. ***SELECTED STATIONS WITH 150% OR MORE OF THE NORMAL PRECIPITATION AND 25.00 INCHES OR MORE PRECIPITATION; OR, STATIONS WITH 25.00 INCHES OR MORE PRECIPITATION AND NO NORMALS DURING SPRING 1991.***

STATION	TOTAL (INCHES)	PCT. OF NORMAL	STATION	TOTAL (INCHES)	PCT. OF NORMAL
HILO/LYMAN, HAWAII, HI	56.97	158.3	MOBILE, AL	30.28	175.6
NEW ORLEANS NAS, LA	37.56	***	MUSCLE SHOALS, AL	29.24	191.6
BOSSIER CITY/BARKSDALE AFB, LA	37.08	***	MILTON/WHITING NAS, FL	29.22	***
TUPELO, MS	35.97	***	TALLAHASSEE, FL	28.25	190.5
NEW ORLEANS/MOISANT, LA	35.83	251.6	MEMPHIS, TN	27.90	172.1
NEW ORLEANS/LAKE FRONT, LA	35.77	***	MERIDIAN, MS	27.31	167.9
SHREVEPORT, LA	35.45	269.6	BILOXI/KEESLER AFB, MS	27.30	177.6
ALEXANDRIA/ENGLAND AFB, LA	33.15	212.1	MONTGOMERY, AL	26.59	186.7
COLUMBUS AFB, MS	32.92	***	PENSACOLA NAS, FL	26.46	***
APALACHICOLA, FL	31.82	311.0	GREENWOOD, MS	26.24	158.1
VALPARAISO/EGLIN AFB, FL	31.74	214.2	MEMPHIS NAS, TN	25.41	***
MONROE, LA	30.62	201.4	PENSACOLA, FL	25.00	179.5
JACKSON, MS	30.53	189.3			

NOTE: Stations without precipitation normals are indicated by asterisks.

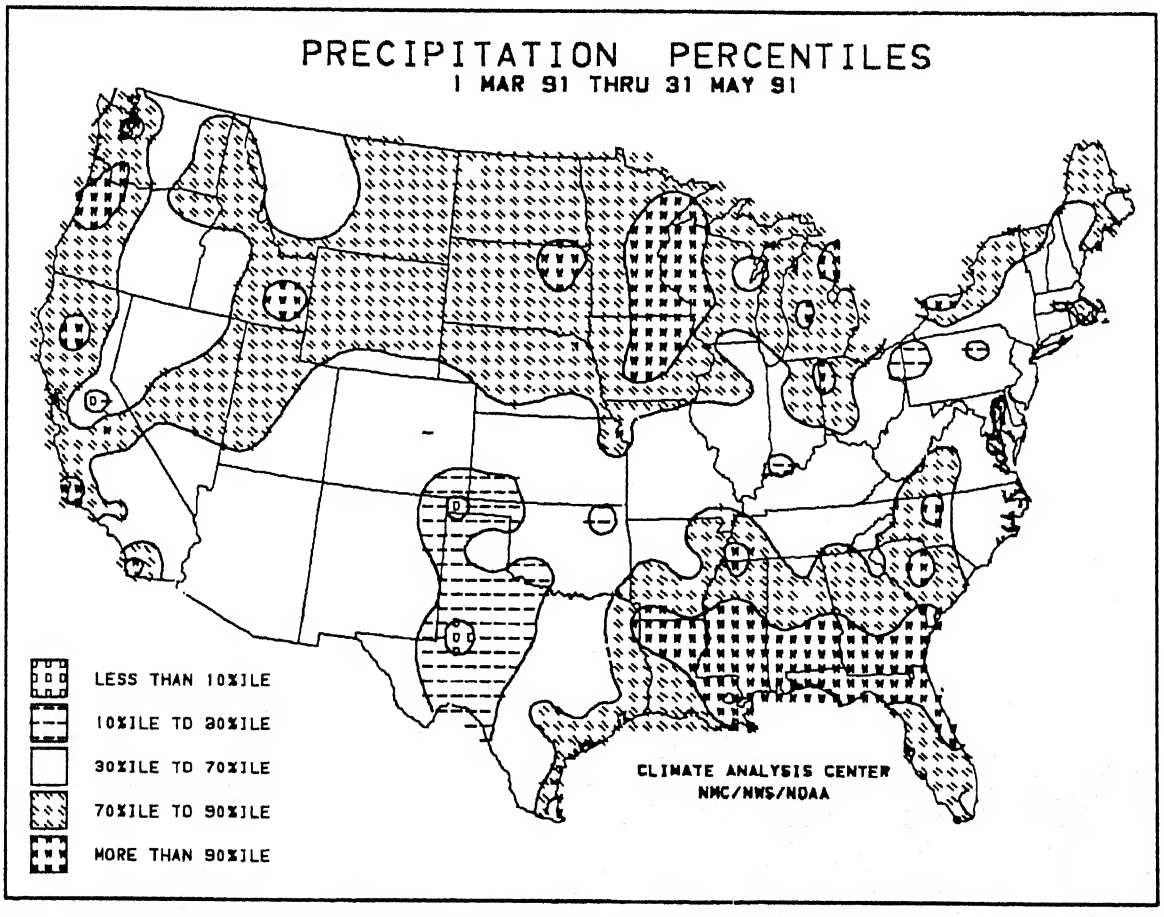


FIGURE 2. Spring 1991 Precipitation Percentiles. *Climatologically significant wetness affected much of the U.S., with most of the Pacific, Gulf, and southern Atlantic coast and northern states, experiencing one of the wettest 30% of the climatological distribution. Dry conditions affected small portions in the central Plains, Ohio Valley, and mid-Atlantic, and central California.*

TABLE 2. *SELECTED STATIONS WITH 80% OR LESS OF THE NORMAL PRECIPITATION AND NORMAL PRECIPITATION OF 6.00 INCHES OR MORE DURING SPRING 1991.*

STATION	TOTAL (INCHES)	PCT. OF NORMAL	NORMAL (INCHES)	STATION	TOTAL (INCHES)	PCT. OF NORMAL	NORMAL (INCHES)
SIDNEY, NE	2.14	33.8	6.33	RICHMOND/BYRD, VA	7.66	76.8	9.97
ABILENE, TX	3.23	48.3	6.69	WILLIAMSPORT/LYCOMI, PA	7.71	71.4	10.80
GAGE, OK	4.06	60.7	6.69	ZANESVILLE, OH	7.76	72.7	10.67
DODGE CITY, KS	4.20	64.3	6.53	ALTOONA, PA	8.10	77.0	10.52
FINDLAY, OH	5.30	53.8	9.86	TULSA, OK	8.71	70.4	12.37
WICHITA FALLS, TX	5.90	64.8	9.09	JOPLIN, MO	9.00	78.1	11.52
MARTINSBURG, WV	6.67	66.0	10.11	MCALESTER, OK	9.14	65.2	14.01
ENID/VANCE AFB, OK	6.76	75.2	8.99	EVANSVILLE, IN	9.92	76.2	13.02
YOUNGSTOWN, OH	7.14	71.6	9.98	ANNETTE ISLAND, AK	17.00	69.1	24.60
AKRON, OH	7.21	71.3	10.11	QUILLAYUTE, WA	19.09	78.2	24.41
WASHINGTON/NATL, DC	7.38	75.3	9.81				

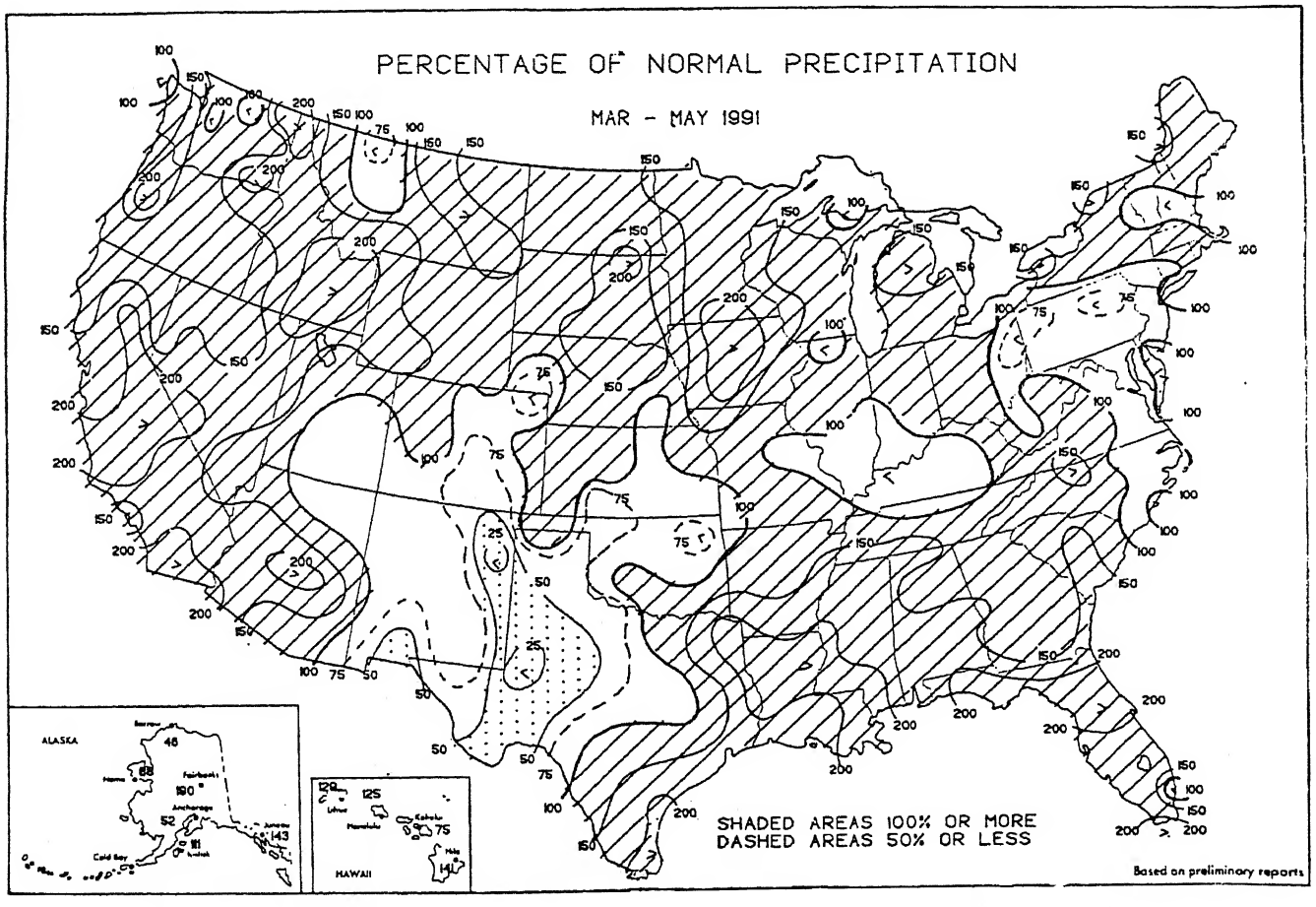


FIGURE 3. Spring 1991 Percent of Normal Precipitation. *Isopleths drawn for 25, 50, 75, 100, 150, and 200 percent. Much of the nation recorded above normal rainfall, with more than twice the normal falling along the Gulf coast and in portions of the western Corn Belt, northern Plains, and the Far West. In contrast, less than half of normal rainfall was measured only in the southern High Plains.*

TABLE 3. ***SPRING 1991 AVERAGE TEMPERATURE 5.5°F OR MORE ABOVE NORMAL.***

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
AKRON, OH	+7.1	55.1	PITTSBURGH, PA	+5.9	55.4
ERIE, PA	+6.8	51.7	CHICAGO/MIDWAY, IL	+5.9	54.9
ST. LOUIS, MO	+6.6	61.6	TOLEDO, OH	+5.9	53.2
YOUNGSTOWN, OH	+6.4	53.1	BUFFALO, NY	+5.9	50.8
MILWAUKEE, WI	+6.4	50.3	BRADFORD, PA	+5.9	47.9
TRAVERSE CITY, MI	+6.3	47.7	FARGO, ND	+5.9	46.6
HOUGHTON LAKE, MI	+6.1	47.1	DEVIL'S LAKE, ND	+5.9	44.0
INTERNATIONAL FALLS, MN	+6.1	42.7	FLINT, MI	+5.7	50.7
COLUMBUS, OH	+6.0	57.0	JAMESTOWN, ND	+5.6	45.5
SOUTH BEND, IN	+6.0	53.9	BETHEL, AK	+5.6	30.7
DETROIT, MI	+6.0	53.0	DECATUR, IL	+5.5	58.3
GRAND FORKS, ND	+6.0	45.0	ZANESVILLE, OH	+5.5	55.7
PELLSTON, MI	+6.0	44.7	PEORIA, IL	+5.5	55.5
BURLINGTON, IA	+5.9	55.8			

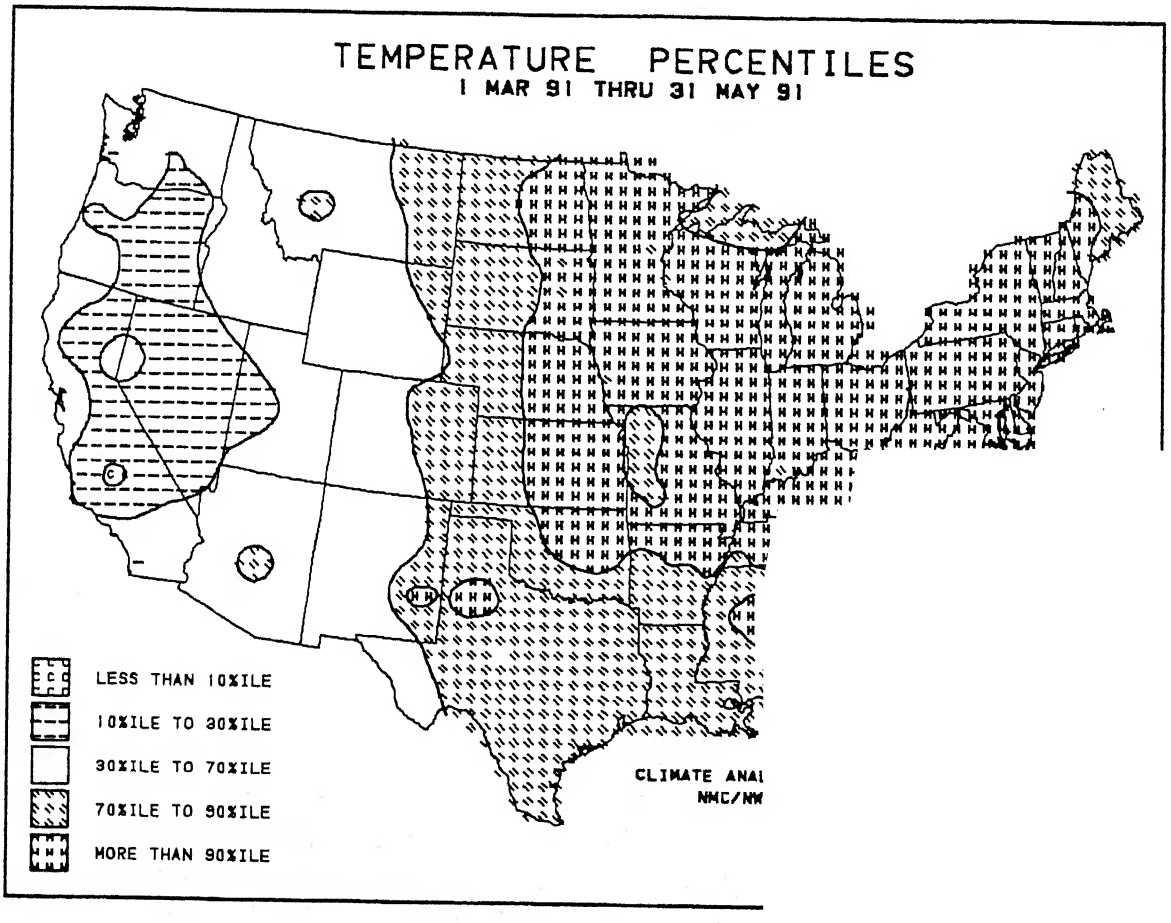


FIGURE 4. Spring 1991 Temperature Percentiles. *Most of the nc significant warmth with much of the eastern half of the country and a in the warmest 10% of the climatological distribution. Much of the Far V 30% of the distribution.*

TABLE 4. *SPRING 1991 AVERAGE TEMPERATURE 2.5°F OR MORE BELOW NORMAL.*

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
REDDING, CA	-4.8	56.3	MEACHAM, OR	-3.0	37.6
PRICE, UT	-4.7	43.7	SEXTON SUMMIT, OR	-3.0	40.0
BLUE CANYON, CA	-3.7	40.6	WALLA WALLA, WA	-2.9	50.2
BAKERSFIELD, CA	-3.7	59.7	BLYTHE, CA	-2.9	68.2
UKIAH, CA	-3.3	53.2	OGDEN/HILL AFB, UT	-2.8	46.4
WINSLOW, AZ	-3.1	50.4	TONOPAH, NV	-2.7	45.7
MARYSVILLE/YUBA CO, CA	-3.1	57.6	LOVELOCK, NV	-2.7	46.4
DAGGETT, CA	-3.1	61.7	BURNS, OR	-2.5	41.5

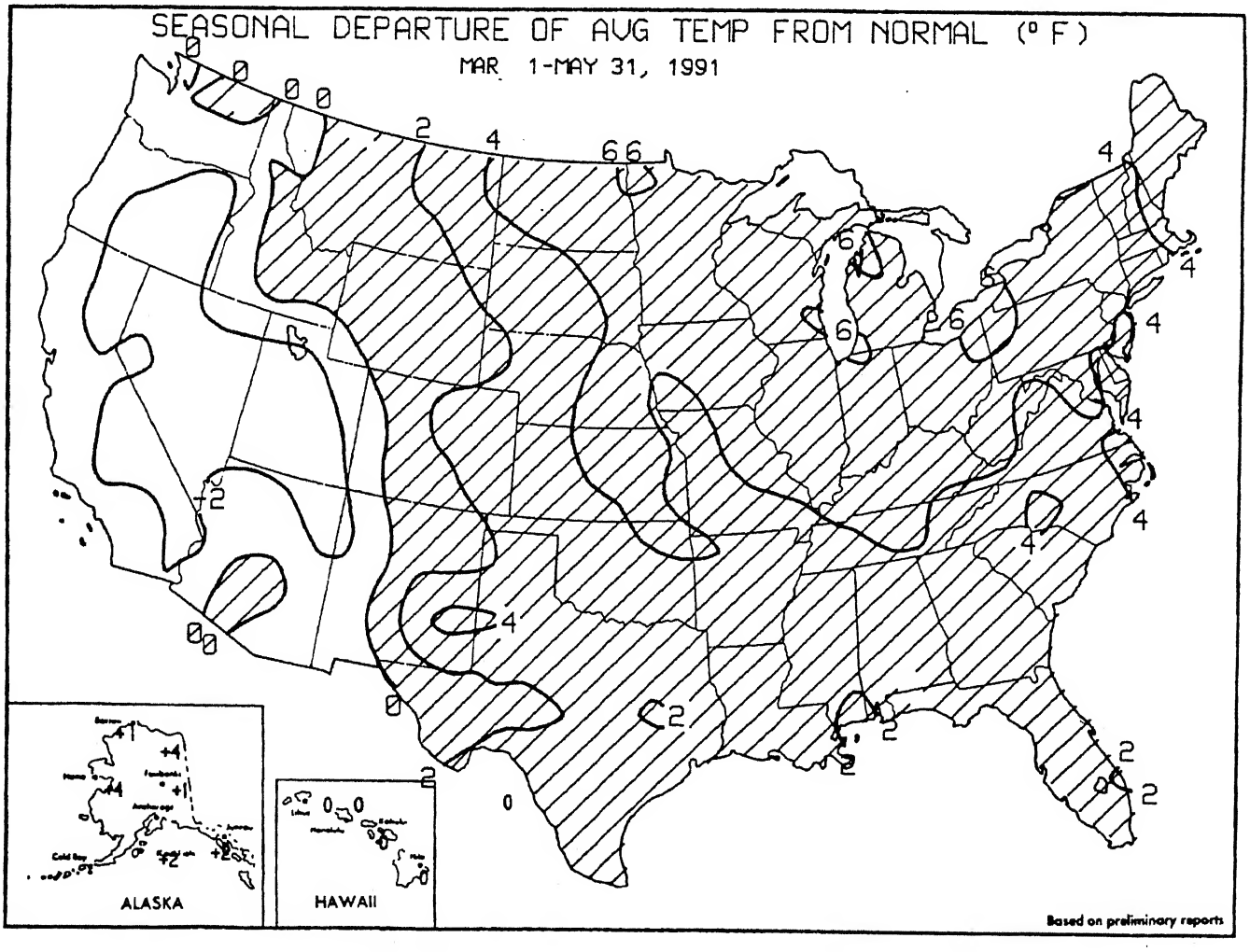


FIGURE 5. Spring 1991 Departure of Average Temperature from Normal (^{0}F). *Isopleths drawn only for -2^{0}F, 0^{0}F, 2^{0}F, 4^{0}F, and 6^{0}F. Most of the nation experienced a hot spring, with seasonal departures reaching + 6^{0}F in portions of the Great Lakes and northern Plains. Negative departures (below -2^{0}F) were limited to the Great Basin and Far West.*

:L NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC ADVISORY 91/03

issued by

DIAGNOSTICS BRANCH
CLIMATE ANALYSIS CENTER, NMC

June 11, 1991

Atmospheric and oceanic indices are consistent in indicating a developing warm ›isode in the tropical Pacific. Sea surface temperature (SST) anomalies increased at any locations in the equatorial Pacific during May [Figure 1]. All three Niño regions :perienced increased index values over those observed during April, with the greatest ıange occurring in the Niño 3 region [Figure 2]. At the same time, the Southern scillation Index (SOI) registered its third consecutive month with values less than or ıual to –1 [Figure 3]. In addition, low–level westerly anomalies were observed in the ree 850 mb index regions during May.

Consistent with the low–level pattern of westerly zonal wind anomalies, upper ɔpospheric equatorial easterly anomalies were observed during April throughout ost of the Pacific,and a strong anomalous anticyclonic circulation center was located :tween 15°S and 20°S near 170°W. An enhanced subtropical jet stream was observed :tween 20°S and 30°S for the second consecutive month. This feature appears to be ɔsely related to persistent blocking, which has occurred in the central and eastern ›uth Pacific sector during the last two months. This blocking pattern also appears to : related to the rather persistent negative sea level pressure anomalies found at low ıd mid–latitudes within this sector, thus contributing to the negative values of the SOI.

Statistical and model forecasts indicate an increase in SST anomalies in the central ıuatorial Pacific during the next two to three seasons. These forecasts are consistent th the observed atmospheric circulation features and SST anomalies in indicating a :veloping warm episode.

The evolution of the anomaly patterns in the tropical Pacific will continue to be ɔsely monitored, especially with regards to further increases in SST anomalies and to e development of strongly enhanced convection in the equatorial Pacific. The next dvisory will be issued when significant further developments are observed.

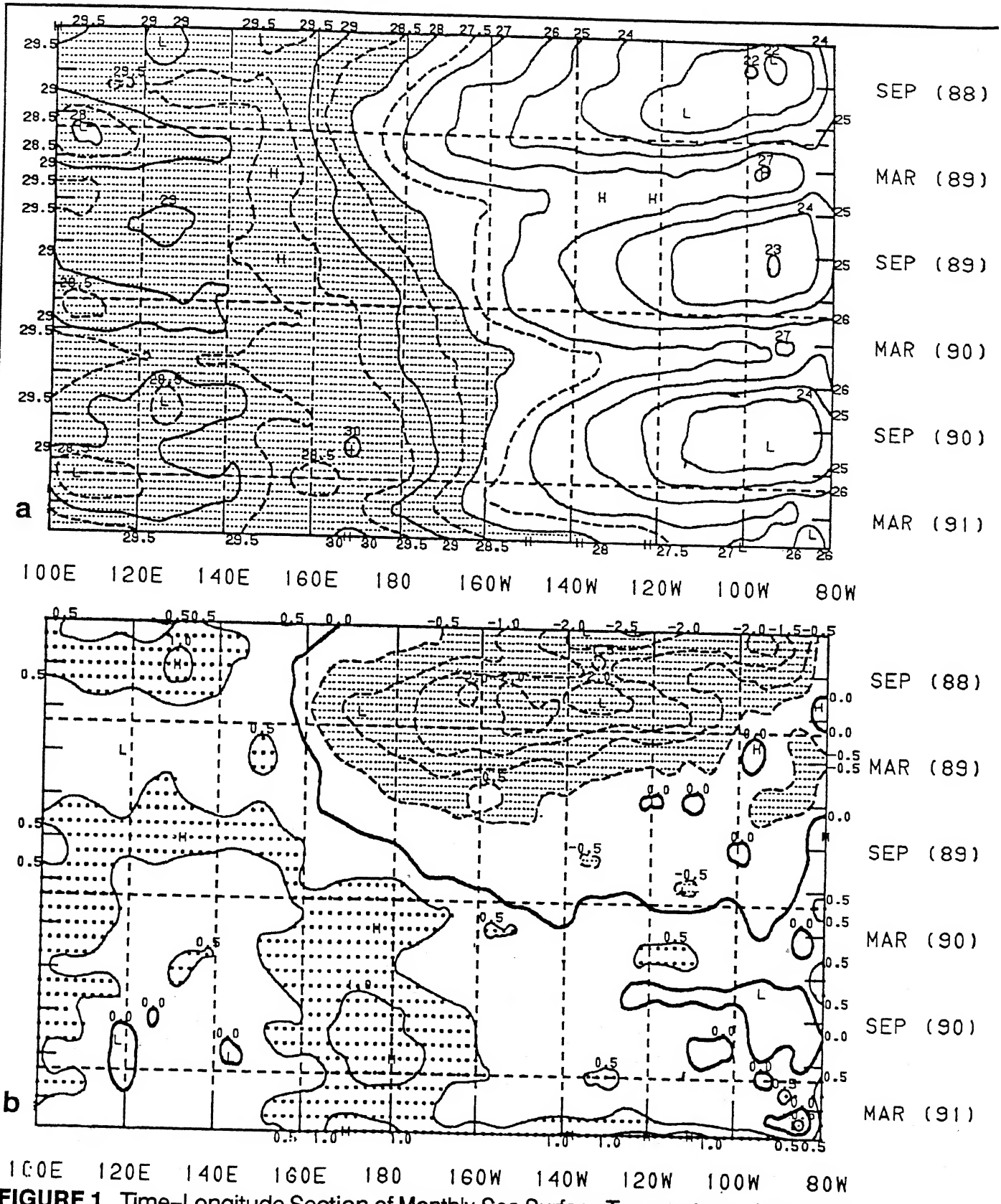


FIGURE 1. Time–Longitude Section of Monthly Sea Surface Temperature, a) Mean and b) Anomalous, for 5°N–5°S. *Contour interval is 1°C and 0.5°C, respectively. SST values greater than 28°C and anomalies less than –0.5°C are shaded. Stippled areas indicate anomaly values greater than 0.5°C. Anomalies are computed based on the COADS/ICE climatology.*

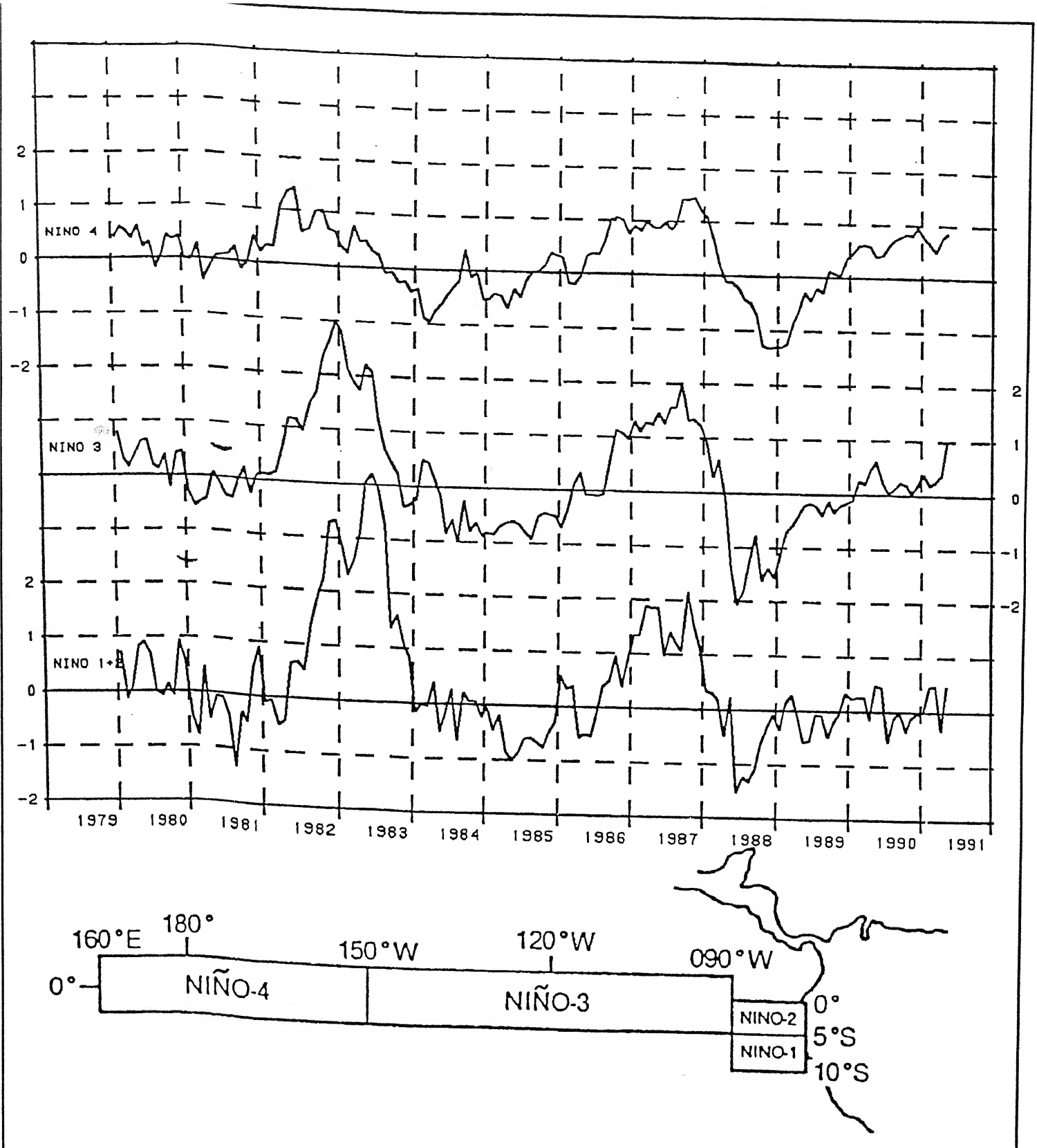


FIGURE 2. Equatorial Pacific Sea Surface Temperature Anomaly Indices (°C; for the areas indicated at the bottom of the figure). *Niño 1+2 is the average over Niño 1 and Niño 2 areas. Anomalies are computed with respect to the COADS/ICE climatology.*

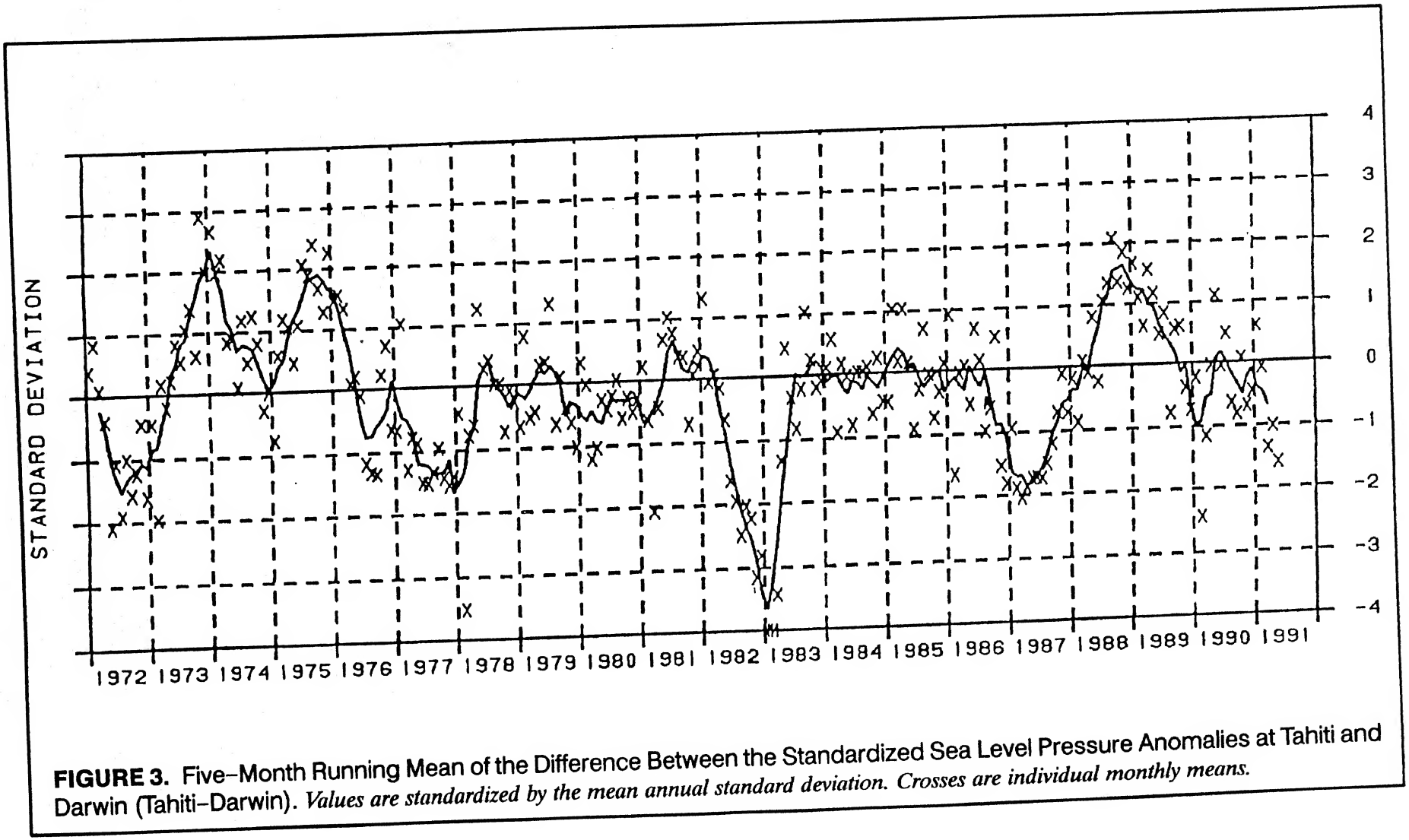


FIGURE 3. Five-Month Running Mean of the Difference Between the Standardized Sea Level Pressure Anomalies at Tahiti and Darwin (Tahiti-Darwin). *Values are standardized by the mean annual standard deviation. Crosses are individual monthly means.*